LL = F
LA = L
RA = R
RL = N

DS6100
Patient Simulator

Operating and Service Manual

DYNATECH NEVADA

DS6100

Patient Simulator

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Operating and Service Manual

DYNATECH NEVADA
World Class People — World Class Products

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Part Number: 9508-0213

Revision: C

Printed in the USA.

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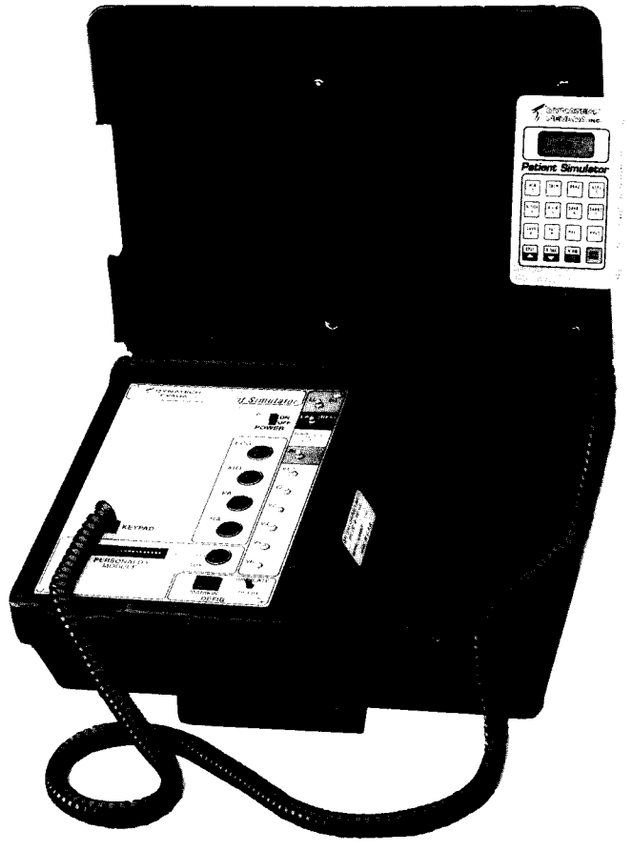


DS 6100 Patient Simulator

Introduction

DS 6100

The DS 6100 is a battery-operated, six-channel patient simulator and defib trainer that simultaneously simulates ECG/arrhythmia, respiration, as well as arterial, pulmonary arterial, and right atrial pressures. Standard waveforms and sequences, selected via keypad, are stored in microcomputer memory within the simulator. In the standard defib training mode, you can interface the DS 6100 with Arrhythmia Anne and Chris Clean manikins. Among the many optional personality modules available, you'll find functions for special purpose ECG, Cardiac Output Dilution Curves, Capnography, and IABP.

SAFETY

Levels of signals available via the ouput connectors and the Personality Module connector do not exceed 12 volts, and, as such, do not constitute a potential danger to the operator. However, if calibration or other service of the DS 6100 is required, we recommend that only qualified service personnel be permitted to remove the front panel of the simulator.

The following front panel controls allow you to operate the DS 6100. See Figure 2 for locations.

1. ON/OFF SWITCH: Switches power on and off. Battery operated unit is rechargeable with the supplied charger.

2. POWER INDICATOR: Illuminates when power is ON.

3. ECG SNAP CONNECTORS: Outputs low level 12 lead ECG. Attach your standard patient ECG cable lead wires to these snap connectors to display the simulated ECG waveforms on your monitor screen.

I = +.25 mv (+/-5%)	V1 = -.40
II = +1.0	V2 = -.90
III = +.75	V3 = +.60
aVR = -.60	V4 = +1.0
aVL = -.25	V5 = +1.5
aVF = +.90	V6 = +1.0

FIGURE 1: 12 Lead ECG Amplitude

NOTE: To minimize 60 cycle artifact, it is important that a reference electrode connection is used. For example, most 5 lead ECG diagnostic recorders require that a simulator's REF signal be connected to the RL input of the patient cable. The DS 6100 can also output the ECG in a modified chest lead configuration (MCL2) used for bedside monitoring. Simply attach the LL(+) red, RA(-) white, and LA(ref) patient cable snaps to the patient simulator. Refer to the operator's manual of your ECG monitor for hook-up instructions.

4. PRESSURE OUTPUT CONNECTORS
Output for arterial, PA, and RA pressures. Simulates the electrical output of the BP transducer that would be used with the patient monitor. The DS 6100 generates signals that are compatible with either 5 or 40 microvolt transducers.

5. AUX INPUT/OUTPUT CONNECTOR: Cable interconnect for optional waveforms such as capnography and IABP.

6. DEFIB CONNECTOR: Input for Arrhythmia Anne or Chris Clean manikins equipped with defibrillation option.

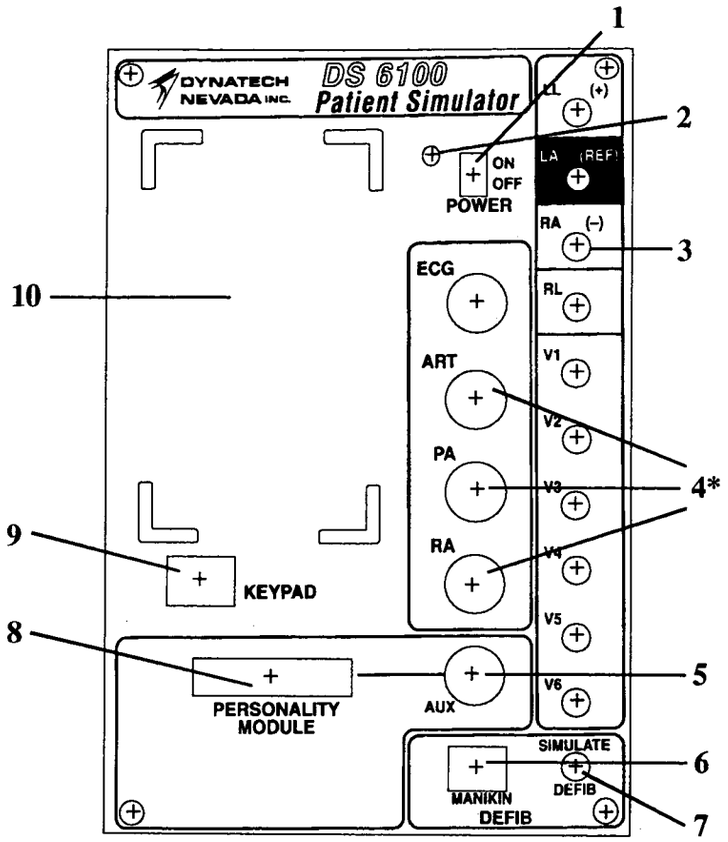
7. MANUAL DEFIB SWITCH: Manually simulates defibrillation.

8. PERSONALITY MODULE CONNECTOR: Input for optional modules. Used to add numerous functions and waveforms to the standard set.

9. KEYPAD CONNECTOR: Input for hand-held keypad.

10. KEYPAD REST: Storage area for keypad.

11. BATTERY CHARGER INPUT CONNECTOR *(Located on inner well)* Jack used to recharge battery. Unit can be operated while recharging.



NOTE: The Battery Charger Input Connector (#11) is located on the inner well.

FIGURE 2: Front Panel Controls

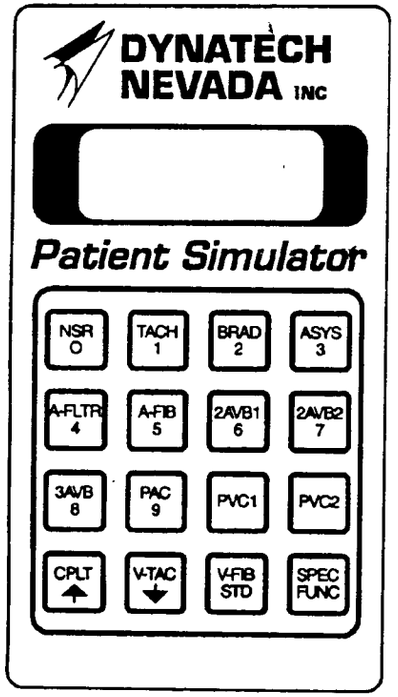


FIGURE 3: Pendant Keypad

USING THE PENDANT KEYPAD

Direct Functions: Select the rhythm desired by pressing one of 15 Direct Function keys. The following pages list all of the functions and code numbers available in the standard simulator unit.

Example: To initiate a bradycardia rhythm, press and release the key labeled BRAD. The simulator automatically determines the proper time in the cardiac cycle to begin a new rhythm.

Special Functions: To initiate a Special Functions rhythm, press and release the red SPEC FUNC key followed by the appropriate two digit code, found in the menu on either side of the keypad. The simulator displays the * to echo the Special Function key selection. You must enter a two digit special function code whenever the * prompt is displayed.

Example: To select a bigeminy rhythm press the red SPEC FUNC key followed by code 27. You are free to select any function in any order, and in doing so, simulate virtually any patient condition sequence. Some of the Special Functions are actually programmed sequences of rhythms or events.

A single PAC or PVC can be inserted into any rhythm by pressing the PAC, PVC1, or PVC2 key. When any of these keys are pressed, the respective PAC or PVC will be inserted into the next cardiac cycle. Only one PAC, PVC1, or PVC2 can be inserted at any one time. The 8 character LCD display echoes key entries by displaying the abbreviated function name.

KEYPAD CONTROLS

Code	Function
00	NORMAL SINUS - Provides a convenient way to return to normal sinus rhythm at a rate of 70 BPM.
01	SINUS TACHYCARDIA - Rapid regular rhythm with normal P wave and heart rate of 140 BPM.
02	SINUS BRADYCARDIA - Slow regular rhythm with normal P wave and heart rate of 35 BPM.
03	ASYSTOLE - No beats but very small irregular signal remains.
04	ATRIAL FLUTTER - Regular ventricular rhythm; atrial flutter with 4:1 conduction.
05	ATRIAL FIBRILLATION - Rapid irregular atrial signal with no real P waves. Irregular ventricular rate.
06	2ND DEGREE AV BLOCK I - Wenckebach. Irregular rhythm with normal P wave. PR interval lengthens progressively until a dropped beat occurs and cycle repeats.
07	2ND DEGREE AV BLOCK II - Slow regular rhythm with normal P wave. PR interval in conduced beats is normal; 3:1 block.
08	3RD DEGREE AV BLOCK - Slow regular ventricular rhythm; regular atrial rhythm. Independent atrial and ventricular rhythms.
09	PAC INSERT - Premature atrial contraction. A single PAC is inserted into the current rhythm when button is pushed.
10	PVC1 INSERT - Premature ventricular contraction. A single PVC1 is inserted into the current rhythm when button is pushed.
11	PVC2 INSERT - Premature ventricular contraction. A single PVC2 is inserted into the current rhythm when button is pushed.
12	COUPLET - Irregular rhythm with frequent couplets and 1 pair ventricular beats. PVCs are premature; compensatory pause follows couplet.
13	VENTRICULAR TACHYCARDIA - Irregular, rapid rhythm with irregular, successive PVCs. No P waves.

14 VENTRICULAR FIBRILLATION - Irregular, rapid, chaotic waveforms with no QRS.

ATRIAL

15 ATRIAL TACHYCARDIA - Rapid, regular rhythm with biphasic P wave.

16 ATRIAL TACHYCARDIA/ABERRANCY - Rapid, regular rhythm with biphasic P wave and notched, wide QRS.

17 FREQUENT PACS - Irregular rhythm with frequent premature PACs and a biphasic P wave.

18 PEDIATRIC TACHYCARDIA - Rapid regular rhythm with tall R wave and narrow QRS.

BLOCKS

19 1ST DEGREE AV BLOCK - Normal beats except with long PR interval of .25 sec.

20 BUNDLE BRANCH BLOCK - Wide QRS complexes. Regular rhythm with a PR interval of .16 sec.

JUNCTIONAL

22 ACCELERATED JUNCTIONAL - Regular rhythm with inverted P wave and short PR interval.

23 JUNCTIONAL - Slow regular rhythm with inverted P wave and short PR interval.

24 FREQUENT PJCs - Irregular rhythm with frequent, premature PJCs followed by a pause. Inverted P wave and short PR interval.

VENTRICULAR

26 IDIOVENTRICULAR - Slow reg. rhythm, no P waves, wide QRS.

27 BIGEMINY - Irregular rhythm alternates between PVC and normal beat.

28 UNIFOCAL PVCs - Frequent, premature unifocal PVCs followed by pause. PVC has wide QRS.

29 MULTIFOCAL PVCs - Regular rhythm with frequent PVCs that alternate between type 1 and type 2. Pause follows PVCs.

30 TRIPLET - Frequent runs of 3 consecutive PVCs.

PACEMAKER

31 VENTRICULAR - Pacer artifact precedes QRS. Regular rhythm, no P waves, wide QRS.

32 ATRIAL - Normal rhythm, pacer artifact precedes P wave.

33 AV SEQUENTIAL - Prolonged PR interval. Pacemaker artifact precedes P and QRS waves. Wide QRS.

34 SENSE & CAPTURE FAIL - Frequent loss of capture, low amplitude escape beat, sensing failure of escape beat.

35 FAILURE TO CAPTURE - No capture. Pacer artifact amplitude is 8mV with 1 msec duration.

MISC ECG

38 CARDIAC FAILURE - Intermittent PVCs and couplet followed by ventricular tachycardia, followed by ventricular fibrillation, followed by asystole.

39 ST ELEVATION - Regular rhythm with ST Elevation at 2 mm 80 msec after J point.

40 ST DEPRESSION - Regular rhythm with ST Depression at 3 mm 80 msec after J point.

41 AGONAL - No P waves; wide complexes with periods of asystole.

42 VENTRICULAR ASYSTOLE - No QRS; regular atrial rhythm.

43 CONVERSION - Vfib with CPR followed by Vfib without CPR for 2 seconds prior to defib. Defib artifact, Brady rhythm with CPR, Brady rhythm without CPR, followed by NSR.

ECG ARTIFACT

46 DEFIBRILLATION - Positive and negative baseline saturation. Artifact is automatically followed by preselected rhythm. See #59 below.

47 60 CYCLE ARTIFACT - Artifact amplitudes 0.1, 0.4, and 0.7 mV p-p. Use INC and DEC keys, or eliminate with STD key.

48 ECG/RESP ARTIFACT - Artifact amplitudes 0.4, 0.6, and 1.0 mV peak to peak. Use INC, DEC keys. STD will eliminate.

49 MUSCLE ARTIFACT - Artifact amplitudes 0.4, 0.6, and 1.0 mV peak to peak. Use INC & DEC keys. STD will eliminate.

50 CPR - CPR artifact at 70/min.

ADJUST

53 ECG RATE ADJUST - Increase or decreases rate in 10% increments. STD returns to standard rate.

54 SIZE ADJUST - Increases and decreases ECG, BP, and respiration waveforms, or returns them to standard size. Use after selecting desired channel.

55 AUTO TREND - Automatically varies NSR heart and respiration rates, and blood pressures. Vtach episode 4 every 1 hour; trend repeats every 2 hours.

DEFIB CONVERSION

59 RHYTHM SELECT - Permits selection of post defib rhythm, which is then automatically inserted after defib artifact.

60 DEFIB DISABLE - Disables auto defib sequence.

RESPIRATION

71 APNEA - Thoracic impedance is simulated via ECG output snaps.

72 RESP AT 10 BPM

73 RESP AT 20 BPM

74 RESP AT 40 BPM

75 RESP AT 80 BPM

76 CVA COINCIDENCE - ECG and respiration are synchronized and timed appropriately for cardiovascular artifact. Impedance drops immediately after each R wave.

77 PEDIATRIC APNEA/BRADY - Intermittent apnea periods. Heart rate drops from 140 BPM to 70 BPM each apnea period.

CALIBRATION

78 HEART RATE CALIBRATION - Calibrated heart rates from 30 to 300 BPM.

81 LINEARITY/SPEED - 2.5 Hz triangular ECG waveform.

82 ECG SIZE CALIBRATION - Cal pulse amplitudes from .25 mV to 2.5 mV.

83 ARRHYTHMIA SEQUENCE - Automatic sequence of arrhythmias over 3 minute period of time. NSR, Dropped Beat, AV Pace, V Pace, Atrial Tach, Couplet, RBBB, Triplet, Bigeminy (3 Foci), VTach.

84 RESPIRATION SIZE CAL - Respiratory depth ranging from 0.25 to 2.5 ohm; calibrated for RA-LA lead.

BLOOD PRESSURE

62 ZERO PRESSURE - Zeroes all three pressure channels as well as auxiliary CO2 channel.

63 PATENT LINE - Outputs a 50 mmHg flush waveform on PA channel. PA waveform follows flush. Trailing edge of flush and PA pressure waveforms demonstrate ideal frequency characteristics of pressure line.

64 RESONANT LINE - Outputs a 50 mmHg flush waveform on PA channel. PA waveform follows flush. Trailing edge of flush and PA pressure waveforms demonstrate resonant frequency characteristics of pressure line.

65 DAMPED LINE - Ouputs a 50 mmHg flush waveform on PA channel. PA waveform follows flush. Trailing edge of flush and PA pressure waveforms demonstrate damped frequency characteristics of pressure line.

66 CATHETER WHIP - Pressure artifact caused by motion of catheter. On PA channel.

67 PRES/RESP ARTIFACT - Varies level of respiration artifact on pressures.

PROCEDURES

68 IABP- Arterial pressure with cardiac assist pressure pulse. 2:1 augmentation. Simulation only; not interactive with the IABP. Output on arterial channel.

69 PA WEDGE - Outputs a PAW waveform.

70 SWAN-GANZ INSERTION - Output on PA channel. Right atrium to right ventricle; right ventricle to pulmonary artery; pulmonary artery to wedged pulmonary artery; wedged pulmonary artery to pulmonary artery.

MODIFIER/CAL MODE

The bottom row of the keypad has three dual function keys: CPLT/up arrow, VTACH/down arrow, and VFIB/STD. These keys can be used in conjunction with the SPEC FUNC keys listed in Figure 4 to increase, decrease, or reset the standard value for parameters such as rate, waveform amplitude, or artifact level. When selected, these functions will display one of the following prompts: INC, DEC, or STD. See following pages for operating instructions.

INC (Up Arrow): Increases parameter value. Momentarily displays "at max" when maximum value is reached.

DEC (Down arrow): Decreases parameter value. Momentarily displays "at min" when minimum value is reached.

STD: Resets parameter value. All of the remaining keys exit the Modifier/Cal function, retain parameter level, and simulate rhythm selected. (i.e. NSR, Bradycardia, etc.)

53 *Rate Adjust*
54 *Size*
78 *Heart Rate Cal 70 BPM*
82 *ECG Size Cal*
84 *Resp Size Cal*
47 *60 Cycle Artifact*
48 *ECG/Resp Artifact*
49 *ECG/Muscle Artifact*

FIGURE 4: Special Functions used in the Modifier/Cal Mode

SIZE ADJUSTMENTS: SPEC FUNC 54

The Size Adjust function, SPEC FUNC 54, allows you to adjust the waveform size up or down from the STD level. Figure 9 lists waveform amplitudes for each channel. To adjust the size of a waveform channel:

STEP 1: Select SPEC FUNC 54 (SIZE)

STEP 2: DS 6100: Enter desired channel number, 1 - 6.
ECG = channel 1, ART = 2, PA = 3, RA = 4, AUX = 5, RESP = 6

STEP 3: Press INC to increase, DEC to decrease, STD to reset to standard level. The size adjust function is intended for inservice and demonstration applications when size adjustments may be helpful in demonstrating a clinical situation i.e. Increasing the PA Wedge pressure to simulate LV heart failure.

NOTE: Pressure and R wave values are defined for normal sinus beats only. To obtain nonvarying pressure values, select SPEC FUNC 67 and decrease minimum level. For calibration or performance check applications, use SPEC FUNC 78 (Heart Rate Cal), SPEC FUNC 81 (Linearity/Speed), SPEC FUNC 82 (ECG Size Cal), and SPEC FUNC 84 (Resp Size Cal).

DS 6100 SIZE ADJUST LEVEL - SPEC FUNC 54

CH/PARAMETER	-3	-2	-1	STD	+1	+2	+3	+4
1 ECG R WAVE AMPLITUDE (mV)	.25	.50	.75	1mv	1.25	1.50	1.75	2.0
2 ART SYS/DIAS MEAN (mmHg)	116/62 80	123/66 85	130/70 90	137/73 95	143/76 100	150/80 105	157/84 110	164/88 115
3 PA SYS/DIAS MEAN (mmHg)	14/6 8	21/9 13	27/12 17	33/15 22	41/19 27	48/22 32	55/25 37	61/28 42
4 RA MEAN (mmHg)	2	4	6	8	10	12	14	16
5 AUX (CO, CO2)		Not Adjustable						
6 RESP(RA-LA) (ohms)	.25	.50	.75	1.0	1.25	1.50	1.75	2.0

FIGURE 5: Size Adjust Special Function

CALIBRATION FUNCTION LEVELS: SPEC FUNC 78, 82, & 84

Special function keys 78, 82, and 84 allow you to adjust calibration levels for heart rate, linearity/speed, ECG size, and respiration size as follows:

ADJUSTMENT LEVELS														
-4	-3	-2	-1	STD	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12
SPEC FUNC 78: HR CAL																
30	40	50	60	70	80	90	100	121	142	163	183	203	227	250	268	300
SPEC FUNC 82: ECG/SIZE/CAL																
.25	.50	.75		1	1.25	1.5	1.75	2.0	2.5	mV						
SPEC FUNC 84: RESP SIZE CAL																
.25	.50	.75		1	1.25	1.5	1.75	2.0	2.5	Ohm						

FIGURE 6: Calibration Functions

HEART RATE ADJUSTMENT: SPEC FUNC 53

The Rate Adjust function, SPEC FUNC 53, offers you the option of adjusting rates up or down in 10% increments. Figure 7 lists the heart rates which can be obtained for the various rhythms. On Power-up, each rhythm has the standard heart rate (STD) listed below. For performance check applications, the Heart Rate Calibration, SPEC FUNC 78 (ECG RATE), provides calibrated heart rates from 30 to 300 BPM. See Fig 6.

RHYTHM	-40%	-30%	-20%	-10%	STD	+10%	+20%	+30%
Bradycardia	21	24	28	31	35	38	42	45
Ventricular	21	24	28	31	35	38	42	45
Junctional	24	28	32	36	40	44	48	52
Normal Sinus	42	49	56	63	70	77	84	91
Sinus Tach	84	98	112	126	140	154	168	182
Atrial Tach	90	105	120	135	150	165	180	195
Atrial Fib	60	70	80	90	100	110	120	130

FIGURE 7: Heart Rates Obtained via Rate Adjust Spec Func 53

ARTIFACT SIMULATION: SPEC FUNC 47, 48, & 49

Various types of artifact can be superimposed on the ECG. The type and level of artifact is selected via the Special Function keys 47, 48, and 49. To enable artifact, select the desired function, increase or decrease the level of artifact via the INC, DEC keys. The STD key returns the simulator to the standard level of artifact.

FUNC	TYPE	STD	+1	+2	+3
47	ECG 60 Hz	0	.1	.4	.7 mV
48	ECG RESP	0	.4	.6	1.0 mV
49	ECG MUSCLE	0	.4	.6	1.0 mV

FIGURE 8: Artifact Modifier Functions

RESPIRATION

The DS 6100 provides a varying thoracic impedance signal via all 10 ECG electrode output snaps. Several respiration rates from apnea to 80 BPM can be selected. Once a respiration rate has been selected, the respiration rate remains fixed during subsequent rhythm selections or until a new respiration rate is selected.

The amplitude of the thoracic impedance signal (R) can be varied using Size Adjust, SPEC FUNC 54 and selecting Channel #6. Use the INC, DEC, and STD keys to vary the impedance amplitude. Respiration amplitudes will differ depending upon the lead that is monitored. Figures 5 & 6 list amplitudes for the RA-LA lead.

NOTE: For calibration applications, use the Respiration Size Cal Function, SPEC FUNC 84 (Figure 6). This function displays impedance amplitudes.

Pressure waveforms are modulated by the respiration waveforms to simulate respiration artifact. The respiration artifact level can be varied using Pressure/Respiration Artifact, SPEC FUNC 67.

Cardiovascular artifact or ECG/respiration coincidence can be simulated by selecting the CVA Coincidence, SPEC FUNC 76. The impedance signal is synchronized with the ECG. Impedance decreases after each R wave, simulating a decrease in impedance due to an increase in pulmonary blood volume during systole.

DEFIBRILLATION TRAINING

In the Defib Training Mode, you can interface the DS 6100 with the Laerdal "Arrhythmia Anne" and the Armstrong "Chris Clean" manikins for realistic defibrillation and ECG paddle monitoring training. Follow the guidelines provided by your training manikin for proper cable connection.

STEP 1: Connect the torso skin cable into the Defib Training Connector. Turn the DS 6100 on.

STEP 2: Select life threatening arrhythmia. i.e. VFIB.

STEP 3: To enable the automatic defib conversion feature and select the post defib rhythm:

a.) Press and release the red Special Function key

b.) Enter code number 59 to initiate the Defib Rhythm Select function.

c.) Select the desired post-defib rhythm by pressing a direct function key, or by pressing the red Special Function key followed by the two digit code number of the desired rhythm. If a post defib rhythm is not programmed, the defib artifact will be followed by asystole until another rhythm is manually selected.

STEP 4: To initiate the defibrillation sequence:

Defibs equipped with apex/sternum paddles - Firmly place the paddles on the electrodes located on the manikin chest skin or torso cover. Charge the defib to 25 joules for Arrhythmia Anne or up to 400 joules for Chris Clean, and defibrillate.

Defibs equipped with disposable electrodes - Plug in adapters and connect cables from defib to adapter snaps. Charge defib to desired energy level and discharge the defibrillator.

CAUTION: See the Arrhythmia Anne and "Chris Clean" instruction manuals for the proper procedures and use of the defibrillator on the manikin. Under no circumstances should a defibrillator be discharged directly into the DS 6100.

After defibrillation of the manikin, the DS 6100 will simulate defibrillation artifact followed by your preselected rhythm. The programmed post defibrillation rhythm can be changed at any time by repeating STEP 2.

STEP 5: To repeat a sequence, select another life threatening rhythm and defibrillate. The defib conversion feature can be disabled at any time by selecting SPEC FUNC 60 (NO DEFIB).

MANUALLY INITIATING A DEFIB SEQUENCE

Use the defib switch on the DS 6100's front panel, or SPEC FUNC 46 (DEFIB). When the Defib Artifact Function is selected, defib artifact will be simulated. If a post defib rhythm has been programmed, the defib artifact will be automatically followed by the programmed rhythm.

BLOOD PRESSURE SIMULATION

If you want to check the calibration of your invasive pressure monitor, it is important to first zero each pressure channel of the monitor. Connect BP cables from the simulator to your monitor, then:

1. Zero monitor before turning the DS 6100 on. When you do turn the DS 6100 on, it will automatically output an NSR ECG waveform and the normal BP waveforms.

OR

2. Turn the DS 6100 on and select SPEC FUNC 62 (0 mmHg). Up to three pressure channels can be zeroed simultaneously via channels 2-4. Use the pressure monitor manufacturer's suggested procedure to obtain a 0 mmHg pressure baseline for each pressure channel.

After successfully adjusting the monitor's zero point, select SPEC FUNC 79 to check calibration of the pressure monitor. Then select the desired pressure waveform via special function or direct function keys to output dynamic BP waveforms on all three channels. Pressure cables (listed on page 33) are available to connect the DS 6100 to most pressure monitors.

NOTE: Figure 5 defines systolic, diastolic, and mean values of the dynamic pressure waveforms for normal sinus beats. If your monitor or recorder does not closely agree with these pressure values, any of the following may be true:

1) The monitor or recorder is not calibrated or properly zeroed.
2) The interconnect cable is not supplying an excitation reference voltage required by DS 6100.
3) The interconnect cable is wired to the wrong signal output pin.
4) Respiration artifact on the pressures modulate the pressure values in sync with the respiration cycle. This artifact significantly alters the systolic/diastolic values. To remove respiration artifact, select SPEC FUNC 67, (PRES RESP) and decrease to the minimum level.

PERSONALITY MODULES: OPTIONAL SPECIAL FUNCTIONS

Optional Personality Modules can be plugged into the front panel connector to increase the number of special functions available. **It is necessary to turn the simulator power off before inserting or removing a Personality Module.** Each Module has a function menu listing the functions and code numbers within the Module's memory. These functions will be assigned code numbers between 89 and 99. Personality Modules currently available are listed below.

DS 6100

6070-03 Pediatric ECG
Sinus Arrhythmia
Junctional
Junctional Escape
Wandering Pacer
Hyperkalemia
Enlarged Atrium
CPR Artifact
Sinus Tachycardia

6070-06 Advanced Pacer
Undersensing
Oversensing Muscle Artifact
Oversensing Tall T Waves
Fusion
Pseudo Fusion
Runaway Pacer
PAC with DVI Pacer
Retrograde VA Conduction

6070-07 MCL1 Atrials
Normal Sinus Rhythm
Bradycardia
Sinus Arrest
Atrial Tach
Atrial Flutter
Atrial Fib
PAC
PAT

6070-08 MCL1 Blocks
Normal Sinus Rhythm
1st degree AV block
2nd degree AV block Type I
2nd degree AV block Type II
3rd degree AV block
RBBB
LBBB

6070-09 MCL1 Ectopy/Aberrancy
Normal Sinus Rhythm
Right PVC
Left PVC
Multifocal PVCs
R on T
Bigeminy
Atrial Fib w/Aberrancy
Cardiac Failure Sequence

6070-10 MCL1 Set (07, 08, 09)
Includes the three MCL1 modules listed above.

6070-13 12 Lead Set
Includes modules 6070-14, 6070-15, and 6070-16.

6070-14 12 Lead Normal ECG
6070-15 12 Lead Anterior Infarct
6070-16 12 Lead Inferior Infarct
Leads I, II, III
AVR, AVL, AVF, V1

6070-01 IABP
Early Inflation
Late Inflation
Early Deflation
Late Deflation
Proper Timing

6070-05 Intra-Cranial Pressures
Normal ICP
Normal with Resp Artifact
Damped with Resp Artifact
Cough Artifact
Hypercapnia
B Wave & A Wave
Jugular Comp

6070-11 Left Heart Pressures
Pressure Zero
Normal AO, LV, LA
AO to LV Insertion
LV to AO Pullback
AO, LV, and LA with PVCs

6070-12 Valve Disease
Mitral Stenosis
Mitral Regurgitation
Aortic Stenosis
Aortic Regurgitation
LV/AO Pullback with AS
LV/AO Pullback with AR

6070-17 ST Segments
2.5mm Horizontal ST Depression
2.5mm Horizontal ST Elevation
ST Downslope Depression
ST Upslope Elevation
ST Upslope Depression 45°
ST Upslope Depression 30°
ST Upslope Depression 20°

6070-18 CO Dilution Curve 0°C
Injectate temp for use w/6070-23

6070-20 CO Dilution Curve 25° C
Injectate temp for use w/6070-22

6070-22 CO2/Cardiac Output 25° C
6070-23 CO2/Cardiac Output 0° C
CO at 5L/4L/3L per minute
Left to right shunt
Prolonged Curve
Interrupted Injectate
Normal Respiration
Embolism
Cheyne Stokes
Deep Sigh
CO2 Zero

6070-25 IABP Interactive Kontron*
(7, 10, K2000, KAAT)

6070-26 IABP Interactive Datascope*
(System 80)

6070-29 IABP Interact Datascope 90*
(System 90)

6070-30 IABP Interact Arles*
Early Inflation
Late Inflation
Early Deflation
Late Deflation
Proper Timing

**See description on the following pages*

INTERACTIVE IABP PERSONALITY MODULES

The Interactive Intra-Aortic Balloon Pump personality modules are used with the DS 6100 simulator and Kontron, Datascope System 80, Datascope System 90, and Aries monitors. Invasive arterial BP and sync timing cables are included with each module. To generate the special waveforms:

Step 1: Determine the need for a balloon according to monitor used.

Datascope 90: It is essential that a balloon (or suitable replacement) be connected to the Balloon Output connector for proper operation of the Datascope 90 pump.

Datascope 80, Kontron, Aries: It may be necessary to defeat the alarm by connecting a balloon or suitable replacement to the Balloon Output Connector.

Step 2: Connect Datascope/Kontron/Aries ECG cable to the DS 6100 ECG snap connectors.

Step 3: Insert the Interactive IABP module into the DS 6100's Personality Module connector. Turn the DS 6100 on.

Step 4: Connect the following cables to their respective monitors:
Datascope 90: connect cable #3010-0314 (GE 3100/Datascope 6F cable) from the Datascope Pressure Transducer input connector to the DS 6100's ART connector

Datascope 80: cable #3013-0314 (GE 3100/Datascope 6F cable) from the Datascope ART PRES input connector to the DS 6100's ART connector.

Kontron 7, 10, 2000, KAAT: cable #3010-0354 (Kontron High Level cable) from the KONTRON AUX input connector to the DS 6100's ART connector (Kontron 2000 ART input)

Aries: cable #3010-0315 (4100-9 SpaceLabs 6M cable) from the ARIES ART PRES input connector to the DS 6100's ART connector.

Step 5: Remember to zero the arterial pressure channel on the pump. To simulate atmospheric pressure, select SPEC FUNC 62 (0mmHg). Use the module's suggested procedure to obtain a 0mmHg pressure reading. When zeroed, select any cardiac rhythm to bring the arterial waveform on the screen.

Step 6: Connect the following IABP cable assemblies to the DS 6100's AUX connector:

Datascope 90: 3010-0352 from the DATA COM output connector
Datascope 80: 3010-0351 from the System INTERFACE output connector
Kontron: 3010-0353 from the ASSIST INTERVAL output connector
Aries: 3010-0353 from the ASSIST INTERVAL output connector

Step 7: Turn the balloon pump on and follow normal procedures for initializing the pump. Select a 2 to 1 assist ratio.

Step 8: The DS 6100 will respond to the balloon pump's inflation/deflation signal with the appropriate augmented arterial pressure waveform. Change ECG rhythms using the DS 6100's keypad.

CARDIAC OUTPUT PERSONALITY MODULES

The DS 6100 can be used with either of two Cardiac Output Personality Modules, 0 Degrees C injectate temperature (model 6070-18) and 25 Degrees C injectate temperature (model 6070-20). Both simulate the Edwards style blood temperature catheter in generating several dilution curves.

The dilution curve at 0 degrees C injectate temperature assumes the following conditions:
10cc Injectate volume
Edwards 93-131-7F Catheter
Injectate Bath Probe, 90.22 k ohms (compatible with Switchcraft connector SL-40-47F)
Computation Coefficient .542*

The dilution curve at 25 degrees C injectate temperature assumes the following conditions:
10cc Injectate volume
Edwards 93-131-7F Catheter
Injectate Bath Probe, 62.34 k ohms (compatible with Switchcraft connector SL-40-47F)
Computation Coefficient .595*

**The use of other computation LM10 coefficients could result in CO values other than specified.*

Follow these steps when using the CO module:

Step 1: Insert the Cardiac Ouput Module into the DS 6100's Personality Module connector. Turn on the DS 6100.

Step 2: Connect the CO computer's BT (blood temperature) cable to the CO Module's 3 pin connector. (The BT cable in the clinical setting is attached to the thermistor on the Swan-Ganz catheter.)

Step 3: Connect the CO computer's injectate temperature cable to the black injectate temperature box which simulates 0 or 25 degrees C temperature.*

Step 4: Set up CO computer per the manufacturer's instructions. When ready to inject select SPEC FUNC and number for CO curve desired. (Curves listed on module)

** The internal resistor value is selected to meet the input requirements of the American Edwards or SpaceLabs bath probe injectate temperature. We suggest using the actual bath probe and bath to meet the input requirements for other desired cardiac output computer systems or modules. Some patient monitoring systems will default to an iced injectate (0° C) if no bath probe is attached to the system.*

CAPNOGRAPHY PERSONALITY MODULE

The DS 6100's Capnography Personality Module is available in combination with Cardiac Output Models 6070-22 and 6070-23. The capnography function simulates the graphic portrayal of the varying CO2 levels during the respiratory cycle. Capnography simulation is possible only with selected patient monitors. Compatible monitors (see list below) require the following interconnect cables:

MONITOR	CO2 Cable to order
Spacelabs Alpha 9, 14, PC	#6085-03, P/N 3010-0333
Spacelabs 500, 600	#6085-04, P/N 3010-0334
Mennen	#6085-05, P/N 3010-0335

NOTE: The Capnography option is not compatible with other manufacturers' CO2 monitors because they lack analog CO2 input.

Step 1: Insert the CO/CO2 personality module into the DS 6100 personality module connector. Turn the DS 6100 on.

Step 2: Connect the CO2 cable from CO2 monitor Auxiliary Input to the DS 6100 AUX channel.

Step 3: Remember to calibrate the CO2 line. Select SPEC FUNC 99 (0mmHg). Use the CO2 monitor manufacturer's suggested procedure for calibration.

Step 4: Select SPEC FUNC 95 through 98 to obtain the specific capnography waveform desired.

BLOOD PRESSURE CABLES

To ensure proper operation, be sure the interface cables you are using between simulator pressure outputs and your equipment include the proper connectors and wiring. If you wish to assemble cables, please refer to the list below. Figures 9 through 13 on the following page show the proper wiring for cables connecting channels 2-4 to most pressure monitors. For assistance in wiring pressure cables, please contact DNI.

NOTE: A special interface cable is not necessary for either ECG or respiration since the simulator's ECG snap outputs are directly compatible with most standard patient cable lead wires.

MODEL	ITEM
4100-01	Unterminated
4100-02	HP 5uV (5F)
4100-03	HP 40uV (5F)
4100-04	HP 5uV (12M)
4100-05	HP 40uV (12M)
4100-06	SpaceLabs (5M) (700, Alpha 9,14)
4100-08	GE 3100/Datascope (6F)
4100-09	SpaceLabs (400,500,600,PC)
4100-09	Physiocontrol (6M)
4100-09	MDE Escort (6M)
4100-09	Mennen (6M)
4100-09	Ivy (6M)
4100-11	EforM/Honeywell (6F)
4100-12	BD/Datamedix/Ohio (9M)
4100-14	Abbott (7M)
4100-15	Gould/Care (5M)
4100-18	Litton (4M)
4100-19	Siemens (10M)
4100-20	Kontron/Rouche (6M)
4100-23	Marquette (8M)
4100-24	Burdick DataSim
4100-25	Nihon/Kohden (5M)
4100-37	Honeywell/Meddars(9M)
4100-40	Fukuda Denshi (8M)
4100-42	Siemens Mingo 7 (15M)
4100-50	Armstrong High Level Output
4100-60	Marquette Eagle Series
4100-61	Fukuda Denshi (12M)

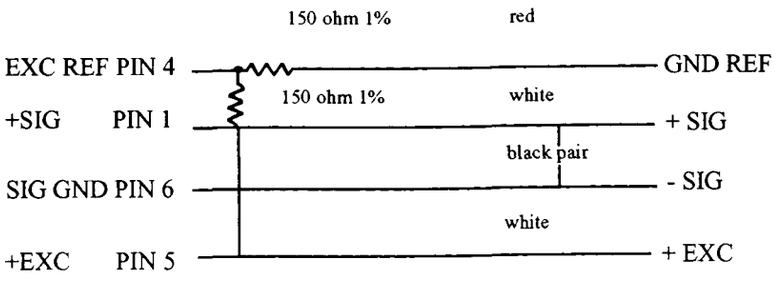


FIGURE 9: Pressure Cable Wiring for Monitor with 5uV/VmmHg sensitivity

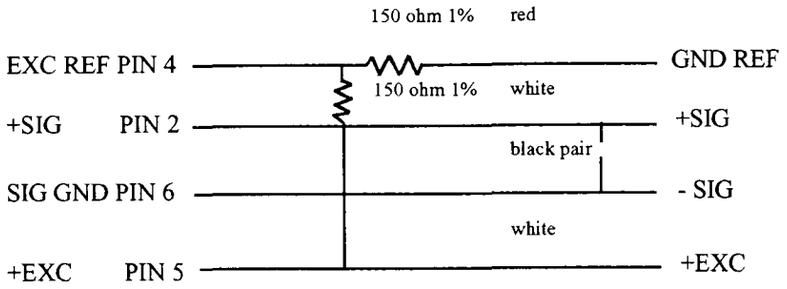


FIGURE 10: Pressure Cable Wiring for Monitor with 40uV/VmmHg sensitivity

NOTE: To minimize noise, the +/- SIG wires should be a twisted pair, as should the +/- EXC wires.

CONNECTOR INTERFACE PIN DEFINITIONS

PIN#*	Function
1	N/C
2	N/C
3	HIGH LEVEL OUT
4	+ 9 V
5	DEFIB IN
6	GND
7	PACER FLAG (5V, 10msec)

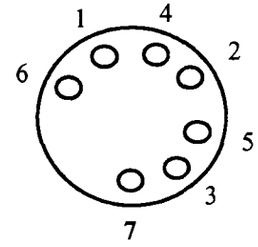
Figure 11: ECG Connector

PIN #*	Function
1	+ Signal Out (5uV/VmmHg)
2	+ Signal Out (40uV/VmmHg)
3	+ High Level Out
4	EXC REF
5	+ Excitation In
6	- Signal
7	+7.15 V. REF

Figure 12: Pressure Connectors

*Cable connector is #2710-0278 or Switchcraft #15GM7M

Figure 13: Connector Pin Assignments



Battery Care

CHARGING THE BATTERY

The rechargeable battery used by the DS 6100 is a 1.9 AH sealed lead acid battery which powers the unit for up to 20 hours. The integrated charger requires up to 10 hours to charge the battery if its charge is significantly depleted. A Low Bat message is displayed when the battery needs to be recharged.

To charge the battery, plug the DS 6100's battery charger into the unit and an AC line power source.

CAUTION: The battery should never be discharged completely. Repeated complete discharging can result in damage to the battery. To avoid this situation:

**Recharge the battery every 6 months if the unit has not been used*

**Immediately begin charging when the battery level is LOW. A fully charged battery will retain at least 95% of its charge for 7 days with the unit turned OFF. The maximum charge time to reach 95% battery capacity is approximately 10 hours.*

REPLACING THE BATTERY

Only qualified service personnel should be permitted to replace the battery. When replacing the battery follow these instructions:

1. Turn power off and disconnect unit from AC line power.
2. Remove the 6 front panel screws.
3. Remove the front panel assembly exposing the battery.
4. Detach the battery wires and remove the battery bracket.
5. Replace with 1.9 AH 12 Volt sealed lead acid battery, part #1001-4004 or equivalent.

Parts List

Ref. Des.	Part No.	Description	Qty
DS 6100 Shipping System (#203301, Rev A)			
ZZ01	9519-0313	DS 6100 FINAL ASSY	1
ZZ02	9508-0213	DS 6100 OPERATOR MANUAL	1
ZZ03	1201-0088	BATTERY CHARGER	1
DS 6100 Final Assembly (#203305, Rev A)			
ZZ01	1001-4004	12V BATTERY DATASIM	1
ZZ02	3010-0347	CABLE SPIRAL 25FT DS2000	1
ZZ03	4704-2435	SCRW PPH 6-32 X 3/8	7
ZZ04	4709-0017	SCRW PBH #6-1/4 SELF TAP	4
ZZ05	4709-0026	SCRW SLF TP (PENDANT RL.)	8
ZZ06	4709-0027	SCRW SLF TP (PANEL MT.)	4
ZZ07	4711-9720	NUT, KEP 6-32 X 1/4	3
ZZ08	4720-0013	RIVET BLACK ANODIZED	6
ZZ09	5001-0426	DS 6100 TOP DATA PANEL	1
ZZ10	5001-0434	DS 6100 SERIAL NO. LABEL	1
ZZ11	5001-0435	DS 6100 SERIAL NO. TAG	1
ZZ12	5001-0437	DS 6100 CASE LABEL	1
ZZ13	5008-0418	DS 6100 PCB SHIELD BASE	1
ZZ14	5023-0138	DATASIM PENDANT RAIL	4
ZZ15	5027-0205	DS 6100 CASE MODIF	1
ZZ16	5205-0294	DS 6100 MAIN PCB ASSY	1
ZZ17	5210-0240	PARTIAL PENDANT ASSY	1
ZZ18	5008-0400	DATASIM BATTERY BRACKET	1
ZZ19	5215-0298	DS6100 TOP PANEL MECH ASSY	1
ZZ20	5215-0299	DS6100 BATTERY PLATE ASSY	1
ZZ21	5215-0300	DS6100 PCB SHLD TOP ASSY	1
ZZ22	9530-0037	DATASIM ACCESS POUCH	1
ZZ23	2719-0213	PWR JACK PLASTIC PANEL MT.	1
ZZ24	4910-0150	SPACER #6 CLR X .485 LONG	1

Ref. Des.	Part No.	Description	Qty
DS 6100 Final Assembly, cont.			
ZZ25	4704-2433	SCRW PPH 6-32 X 1/4	4
ZZ26	3010-0376	DS 6100 BATTERY CABLE	1
ZZ27	4711-0119	WSHR INT/TH TYPA #6	11
ZZ28	5001-0442	PENDANT PRESSURE LABEL	1
ZZ29	5001-0443	DNI PENDANT TOP DATA LBL	1
ZZ30	8006-0015	FOAM TAPE 1 X 1/8 X 2" LONG	A/R
ZZ31	3003-0801	WIRE #22 19/34S BRN 2" LONG	1
ZZ32	3003-0802	WIRE #22 19/34S REN 2" LONG	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly			
C001	0418-0016	CAP CERA .001 UF 50V	1
C002	0418-0008	CAP CERA 0.1MF 50V	1
C003	0401-0015	CAP DIP 10MF 25V	1
C004	0418-0008	CAP CERA 0.1MF 50V	1
C005	0401-0015	CAP DIP 10MF 25V	1
C006	0418-0074	CAP CERM .033 50V	1
C007	0401-0015	CAP DIP 10MF 25V	1
C008	0418-0008	CAP CERA 0.1MF 50V	1
C009	0401-0015	CAP DIP 10MF 25V	1
C010	0401-0015	CAP DIP 10MF 25V	1
C011	0418-0008	CAP CERA 0.1MF 50V	1
C012	0401-0016	CAP DIP 47MF 25V	1
C013	0401-0007	CAP DIP 1MF 35V	1
C014	0415-0012	CAP MICA 18PF 300V	1
C015	0415-0012	CAP MICA 18PF 300V	1
C016	0401-0015	CAP DIP 10 MF 25V	1
C017	0418-0008	CAP CERA 0.1MF 50V	1
C018	0418-0008	CAP CERA 0.1MF 50V	1
C019	0418-0008	CAP CERA 0.1MF 50V	1
C020	0418-0008	CAP CERA 0.1MF 50V	1
C021	0418-0008	CAP CERA 0.1MF 50V	1
C022	0418-0008	CAP CERA 0.1MF 50V	1
C023	0418-0008	CAP CERA 0.1MF 50V	1
C024	0418-0008	CAP CERA 0.1MF 50V	1
C025	0418-0008	CAP CERA 0.1MF 50V	1
C026	0418-0008	CAP CERA 0.1MF 50V	1
C027	0418-0008	CAP CERA 0.1MF 50V	1
C028	0418-0014	CAP CERA .01UF 50V	1
C029	0401-0016	CAP DIP 47MF 25V	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
C030	0418-0008	CAP CERA 0.1MF 50V	1
C031	0418-0008	CAP CERA 0.1MF 50V	1
C032	0418-0008	CAP CERA 0.1MF 50V	1
C033	0418-0008	CAP CERA 0.1MF 50V	1
C034	0418-0008	CAP CERA 0.1MF 50V	1
C035	0418-0016	CAP CERA .001 UF 50V	1
C036	0401-0016	CAP DIP 47MF 25V	1
C037	0418-0008	CAP CERA 0.1MF 50V	1
C038	0418-0008	CAP CERA 0.1MF 50V	1
C039	0418-0008	CAP CERA 0.1MF 50V	1
C040	0418-0008	CAP CERA 0.1MF 50V	1
C041	0418-0008	CAP CERA 0.1MF 50V	1
C042	0418-0008	CAP CERA 0.1MF 50V	1
C043	0418-0008	CAP CERA 0.1MF 50V	1
C044	0418-0008	CAP CERA 0.1MF 50V	1
C045	0418-0008	CAP CERA 0.1MF 50V	1
C046	0418-0008	CAP CERA 0.1MF 50V	1
C047	0418-0008	CAP CERA 0.1MF 50V	1
C048	0418-0008	CAP CERA 0.1MF 50V	1
C049	0401-0015	CAP DIP 10MF 25V	1
C050	0401-0022	CAPTANT 20% 25V 3.3UF RAD	1
C051	0401-0022	CAPTANT 20% 25V 3.3UF RAD	1
C052	0418-0014	CAP CERA .01UF 50V	1
C053	0418-0014	CAP CERA .01UF 50V	1
C054	0418-0008	CAP CERA 0.1MF 50V	1
C055	0418-0014	CAP CERA .01UF 50V	1
C056	0418-0014	CAP CERA .01UF 50V	1
C057	0418-0014	CAP CERA .01UF 50V	1
C058	0401-0007	CAP DIP 1MF 35V	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
C059	0418-0016	CAP CERA .001 UF 50V	1
C060	0418-0016	CAP CERA .001 UF 50V	1
C061	0401-0015	CAP DIP 10MF 25V	1
C062	0418-0014	CAP CERA .01UF 50V	1
C063	0418-0016	CAP CERA .001 UF 50V	1
C064	0418-0016	CAP CERA .001 UF 50V	1
C065	0418-0016	CAP CERA .001 UF 50V	1
C066	0418-0016	CAP CERA .001 UF 50V	1
C067	0401-0015	CAP DIP 10MF 25V	1
C068	0415-0117	CAP MICA 470PF 5% 500V	1
C069	0418-0016	CAP CERA .001 UF 50V	1
C070	0418-0016	CAP CERA .001 UF 50V	1
C071	0418-0016	CAP CERA .001 UF 50V	1
C072	0418-0016	CAP CERA .001 UF 50V	1
C074	0418-0016	CAP CERA .001 UF 50V	1
C075	0418-0016	CAP CERA .001 UF 50V	1
C076	0418-0008	CAP CERA 0.1MF 50V	1
C077	0418-0008	CAP CERA 0.1MF 50V	1
C078	0418-0008	CAP CERA 0.1MF 50V	1
C079	0418-0076	100 PF 50V CERA	1
C080	0418-0076	100 PF 50V CERA	1
C081	0418-0076	100 PF 50V CERA	1
C082	0418-0076	100 PF 50V CERA	1
C083	0418-0076	100 PF 50V CERA	1
C084	0418-0076	100 PF 50V CERA	1
D001	2101-0002	DIODE 1N4001	1
D002	2101-0010	DIODE 1N914/1N4148	1
D004	2101-0010	DIODE 1N914/1N4148	1
D005	2101-0010	DIODE 1N914/1N4148	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
D006	2101-0010	DIODE 1N914 / 1N4148	1
D007	2101-0010	DIODE 1N914 / 1N4148	1
D008	2101-0010	DIODE 1N914 / 1N4148	1
D009	2101-0002	DIODE 1N4001	1
D010	2101-0031	DIODE 80S035 8A RECT	1
D011	2101-0010	DIODE 1N914 / 1N4148	1
DS01	2106-0023	LED YELLOW	1
F001	1005-0184	1A, 250VAC,SLO-BLO,5X20MM	1
J001	2710-0009	CONN 4PIN PCB MOUNT	1
J002	2710-0301	CONN MOD PHONE JK PC MT	1
J003	2710-0165	M HEADER 4 PIN SIP	1
J004	2710-0231	7 PIN DIN FEM PCB ST	1
J005	2710-0105	PCB EDGE CON 36 POS	1
J006	2710-0231	7 PIN DIN FEM PCB ST	1
J007	4919-0088	DATASIM ECG STUD PC MT	1
J008	4919-0088	DATASIM ECG STUD PC MT	1
J009	4919-0088	DATASIM ECG STUD PC MT	1
J010	4919-0088	DATASIM ECG STUD PC MT	1
J011	4919-0088	DATASIM ECG STUD PC MT	1
J012	4919-0088	DATASIM ECG STUD PC MT	1
J013	4919-0088	DATASIM ECG STUD PC MT	1
J014	4919-0088	DATASIM ECG STUD PC MT	1
J015	4919-0088	DATASIM ECG STUD PC MT	1
J016	4919-0088	DATASIM ECG STUD PC MT	1
J020	2710-0301	CONN MOD PHONE JK PC MT	1
L001	1214-0011	INDUCTOR 1 MH AXIAL	1
L002	1214-0011	INDUCTOR 1 MH AXIAL	1
L003	1214-0011	INDUCTOR 1 MH AXIAL	1
L004	1214-0011	INDUCTOR 1 MH AXIAL	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
PR01	2116-0016	MATCHED PHOTO ISO-2	1
R001	0307-1213	RES MF 1/8W 1% 1.62K	1
R002	0316-0204	RES 10K .1% 1/8W	1
R003	0316-0233	RES MF 1/8W .1% 4.3K	1
R004	0307-1681	RES MF 1/8W 1% 49.9	1
R005	0316-0204	RES 10K .1% 1/8W	1
R006	0316-0230	RES MF 1/8W .1% 16K	1
R007	0307-1681	RES MF 1/8W 1% 49.9	1
R008	0307-1724	RES MF 1/8W 1% 54.9K	1
R009	0307-1684	RES MF 1/8W 1% 49.9K	1
R010	0307-1016	RES MF 1/8W 1% 1M	1
R011	0307-1145	RES MF 1/8W 1% 137K	1
R012	0307-1014	RES MF 1/8W 1% 10K	1
R013	0307-1014	RES MF 1/8W 1% 10K	1
R014	0307-1015	RES MF 1/8W 1% 100K	1
R015	0307-1015	RES MF 1/8W 1% 100K	1
R016	0307-1014	RES MF 1/8W 1% 10K	1
R017	0307-1014	RES MF 1/8W 1% 10K	1
R018	0307-1014	RES MF 1/8W 1% 10K	1
R019	0307-1013	RES MF 1/8W 1% 1K	1
R020	0307-1015	RES MF 1/8W 1% 100K	1
R021	0307-1015	RES MF 1/8W 1% 100K	1
R022	0307-1015	RES MF 1/8W 1% 100K	1
R023	0307-1015	RES MF 1/8W 1% 100K	1
R024	0307-1304	RES MF 1/8W 1% 20K.	1
R025	0307-1304	RES MF 1/8W 1% 20K.	1
R026	0307-1304	RES MF 1/8W 1% 20K.	1
R027	0307-1014	RES MF 1/8W 1% 10K	1
R028	0307-1011	RES MF 1/8W 1% 10	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
R029	0307-1013	RES MF 1/8W 1% 1K	1
R030	0307-1013	RES MF 1/8W 1% 1K	1
R031	0307-1682	RES MF 1/8W 1% 499	1
R032	0307-1814	RES MF 1/8W 1% 68.1K	1
R033	0307-1552	RES MF 1/8W 1% 365	1
R034	0307-1552	RES MF 1/8W 1% 365	1
R035	0307-1692	RES MF 1/8W 1% 511	1
R036	0307-1382	RES MF 1/8W 1% 243	1
R037	0307-1552	RES MF 1/8W 1% 365	1
R038	0307-1814	RES MF 1/8W 1% 68.1K	1
R039	0307-1594	RES MF 1/8W 1% 40.2K	1
R040	0307-1304	RES MF 1/8W 1% 20K.	1
R041	0307-1254	RES MF 1/8W 1% 17.8K	1
R042	0307-1414	RES MF 1/8W 1% 26.1K	1
R043	0307-1504	RES MF 1/8W 1% 32.4K	1
R044	0307-1594	RES MF 1/8W 1% 40.2K	1
R045	0307-1014	RES MF 1/8W 1% 10K	1
R046	0307-1012	RES MF 1/8W 1% 100	1
R047	0316-0234	RES MF 1/8W .1% 24.3K	1
R048	0316-0235	RES MF 1/8W .1% 2.88K	1
R049	0307-1012	RES MF 1/8W 1% 100	1
R050	0316-0236	RES MF 1/8W .1% 178	1
R051	0316-0236	RES MF 1/8W .1% 178	1
R052	0307-1252	RES MF 1/8W 1% 178 OHMS	1
R053	0316-0234	RES MF 1/8W .1% 24.3K	1
R054	0316-0235	RES MF 1/8W .1% 2.88K	1
R055	0307-1012	RES MF 1/8W 1% 100	1
R056	0316-0236	RES MF 1/8W .1% 178	1
R057	0316-0236	RES MF 1/8W .1% 178	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
R058	0307-1252	RES MF 1/8W 1% 178 OHMS	1
R059	0316-0234	RES MF 1/8W .1% 24.3K	1
R060	0316-0235	RES MF 1/8W .1% 2.88K	1
R061	0307-1012	RES MF 1/8W 1% 100	1
R062	0316-0236	RES MF 1/8W .1% 178	1
R063	0316-0236	RES MF 1/8W .1% 178	1
R064	0307-1252	RES MF 1/8W 1% 178 OHMS	1
R066	0307-1011	RES MF 1/8W 1% 10	1
R067	0307-1695	RES MF 1/8W 1% 511K	1
R068	0307-1694	RES MF 1/8W 1% 51.1K	1
R069	0307-1015	RES MF 1/8W 1% 100K	1
R070	0307-1692	RES MF 1/8W 1% 511	1
R071	0307-1692	RES MF 1/8W 1% 511	1
R072	0307-1344	RES MF 1/8W 1% 22.1K	1
R073	0307-1933	RES MF 1/8W 1% 9.09K	1
R074	0307-1694	RES MF 1/8W 1% 51.1K	1
R075	0307-1514	RES MF 1/8W 1% 33.2K	1
R076	0301-1220	RES CF 1/2W 5% 2.2	1
R077	0316-0232	RES MF 1/8W .1% 49.9K	1
R078	0307-1013	RES MF 1/8W 1% 1K	1
R079	0307-1934	RES MF 1/8W 1% 90.9K	1
R080	0307-1015	RES MF 1/8W 1% 100K	1
R081	0307-1594	RES MF 1/8W 1% 40.2K	1
R082	0307-1015	RES MF 1/8W 1% 100K	1
R083	0307-1904	RES MF 1/8W 1% 84.5K	1
R084	0307-1011	RES MF 1/8W 1% 10	1
R085	0307-1015	RES MF 1/8W 1% 100K	1
R086	0316-0231	RES MF 1/8W .1% 86.6K	1
R088	0307-1015	RES MF 1/8W 1% 100K	1

Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
RN01	0317-0006	RES NET SIP 10K	1
S001	2507-0018	SW SLIDE 4P2T	1
S002	2505-0068	SPST MOM PC .5 HI PUSH BUT	1
TB01	2710-0293	CONN, 3 PIN SIP .200 CNTRS	1
TB02	2710-0293	CONN, 3 PIN SIP .200 CNTRS	1
TB03	2710-0292	CONN, 2 PIN SIP .200 CNTRS	1
TB04	2710-0294	CONN, 4 PIN SIP .200 CNTRS	1
U001	2118-0013	IC LM358N	1
U002	2118-0163	I.C. 78L09	1
U003	2118-0036	IC 7805	1
U004	2118-0122	ICL7662CPA NEG VOLT GEN	1
U005	2118-0013	IC LM358N	1
U006	2122-0185	IC PLD 44PLCC EP910JC-45	1
U007	2122-0181	MICRO PROC. HD64180RCP6X	1
U008	2122-0054	IC HM6264LP-15/P5164SL-10	1
U009	2122-0186	EPROM AM27C512-175PC	1
U010	2121-0050	INERTER MM74HC04	1
U011	2122-0143	I.C. DAC PM7528	1
U012	2122-0143	I.C. DAC PM7528	1
U013	2118-0116	IC LF442CN	1
U014	2118-0116	IC LF442CN	1
U015	2118-0169	IC LMC662CN DUAL OP AMP	1
U016	2118-0116	IC LF442CN	1
U023	2122-0143	I.C. DAC PM7528	1
U024	2118-0116	IC LF442CN	1
U025	2118-0013	IC LM358N	1
U026	2118-0133	IC XR-L555CP	1
U027	2118-0009	IC MC1723CL	1
U028	2118-0161	IC POWER TRANSIS. LM395T	1

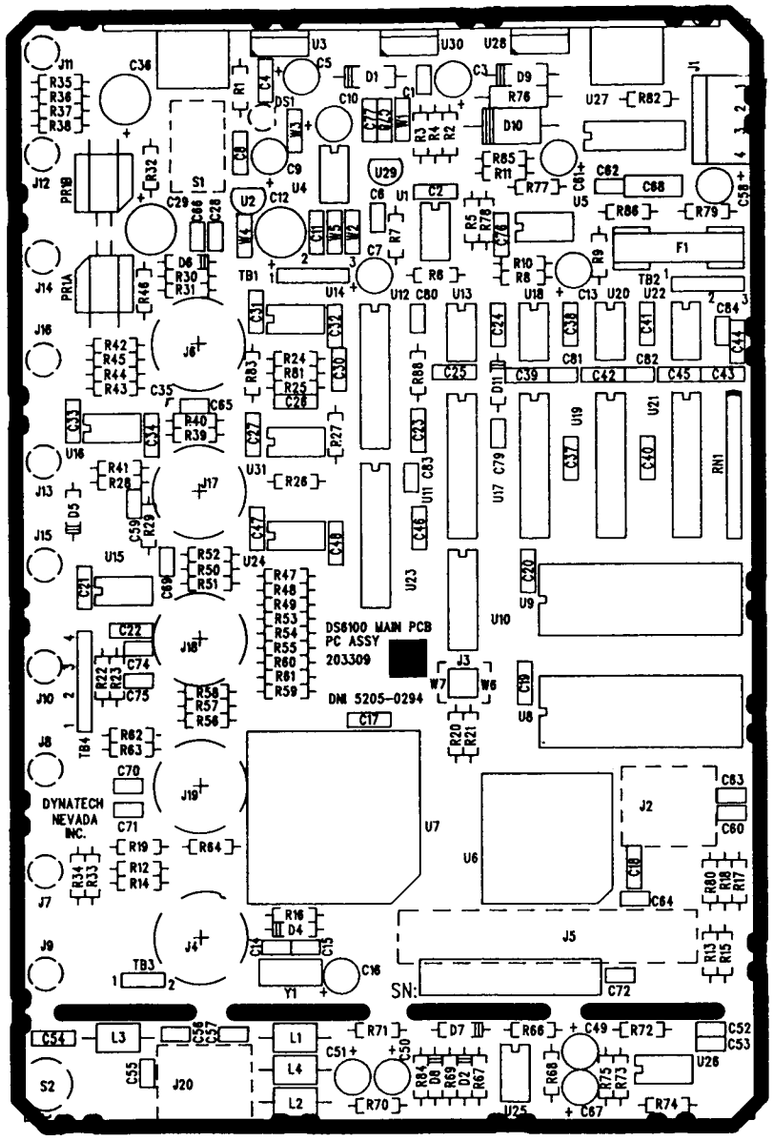
Ref. Des.	Part No.	Description	Qty
Main PCB Assembly, cont.			
U029	2118-0120	IC LP2950ACZ-5.0 +5V REG LP	1
U030	2118-0093	IC REG +15V MC7815CT	1
U031	2118-0116	IC LF442CN	1
Y001	1220-0022	XTAL 12.288 M HZ	1
ZZ01	2712-0003	SCKT IC 8 PIN DIP	14
ZZ02	2712-0015	SCKT IC 14 PIN DIP	2
ZZ03	2712-0017	SCKT IC 20PW DIP	6
ZZ04	2712-0023	SCKT IC 28PIN DIP LP	2
ZZ05	2712-0047	SCKT IC 68 PIN PLCC	1
ZZ06	2712-0048	SCKT IC 44 PIN PLCC	1
ZZ07	5201-0294	DS6000B MAIN PCB BASIC	1
ZZ08	5215-0301	DS 6100 HEAT SINK MECH	1
ZZ10	1006-0019	FUSE CLIP PCB MT 5X20MM	2
ZZ11	4906-0009	SIL PAD TO 220 SING	1
ZZ12	4711-6008	WSHR SHDL #4 NYLON	1
ZZ13	4704-2433	SCRW PPH 6-32X1/4	4
ZZ14	4704-2434	SCRW PPH 6-32X5/16	10
ZZ15	4704-2233	SCRW PPH 4-40X1/4	1
ZZ16	5001-0372	LBL. BARCODE SERIALIZED	1
ZZ17	4711-0119	WSHR INT/TH TYPA #6	14
J017	2710-0231	7 PIN DIN FEM PCB ST	1
J018	2710-0231	7 PIN DIN FEM PCB ST	1
J019	2710-0231	7 PIN DIN FEM PCB ST	1
U017	2122-0134	I.C. DUAL DAC AD7528GP	1
U018	2118-0116	IC LF442CN	1
U019	2122-0134	I.C. DUAL DAC AD7528GP	1
U020	2118-0116	IC LF442CN	1
U021	2122-0134	I.C. DUAL DAC AD7528GP	1
U022	2118-0116	IC LF442CN	1
W006	2710-0166	2 PIN SHORTING PLUG	1
ZZ01	5205-0302	AA 750 PCB ASSY	1

Ref. Des.	Part No.	Description	Qty
Pendant Final Assembly			
ZZ01	5027-0206	DS PENDANT ENCL MODIF	1
ZZ02	5205-0299	DS PENDANT PCB ASSY	1
ZZ03	5001-0440	DS 6100 PEND CARDIO LABEL	1
ZZ04	5001-0442	DS 6100 PEND RESP LABEL	1
ZZ05	5001-0443	DNI PEND TOP DATA LABEL	1
ZZ06	4709-0024	SCRW MET 3MX12M PFH BLK	4
ZZ07	4709-0022	SCRW 4-40 X 5/8 PFH BLK	4
Pendant PCB Assembly (#203383, Rev B)			
C001	0415-0012	CAP MICA 18PF 300V	1
C002	0415-0012	CAP MICA 18PF 300V	1
C003	0418-0008	CAP CERA 0.1MF 50V	1
C004	0401-0015	CAP DIP 10MF 25V	1
C005	0401-0007	CAP DIP 1MF 35V	1
C006	0418-0016	CAP CERA .001 UF 50V	1
C007	0418-0016	CAP CERA .001 UF 50V	1
C008	0418-0016	CAP CERA .001 UF 50V	1
D001	2101-0010	DIODE 1N914 / 1N4148	1
D002	2101-0010	DIODE 1N914 / 1N4148	1
DS01	2410-0016	LCD DISPLAY 1 X 8	1
J001	2710-0303	CONN MD PH JK PC MT R/A	1
J002	2710-0199	CONN 14P DIP HDR MALE ST	1
J003	2712-0048	SCKT IC 44 PIN PLCC	1
Q001	2111-0002	TRANS NPN 2N3904	1
Q002	2111-0002	TRANS NPN 2N3904	1
R001	0300-1107	RES CC 1/4W 5% 10M	1
R002	0307-1664	RES MF 1/8W 1% 47.5K	1
R003	0307-1014	RES MF 1/8W 1% 10K	1

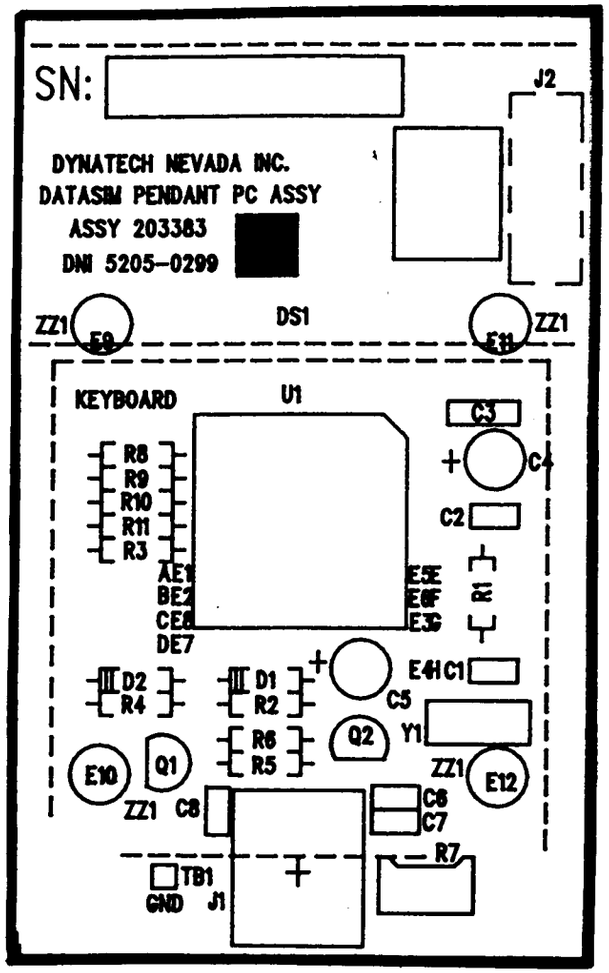
Pendant PCB Assembly, cont.

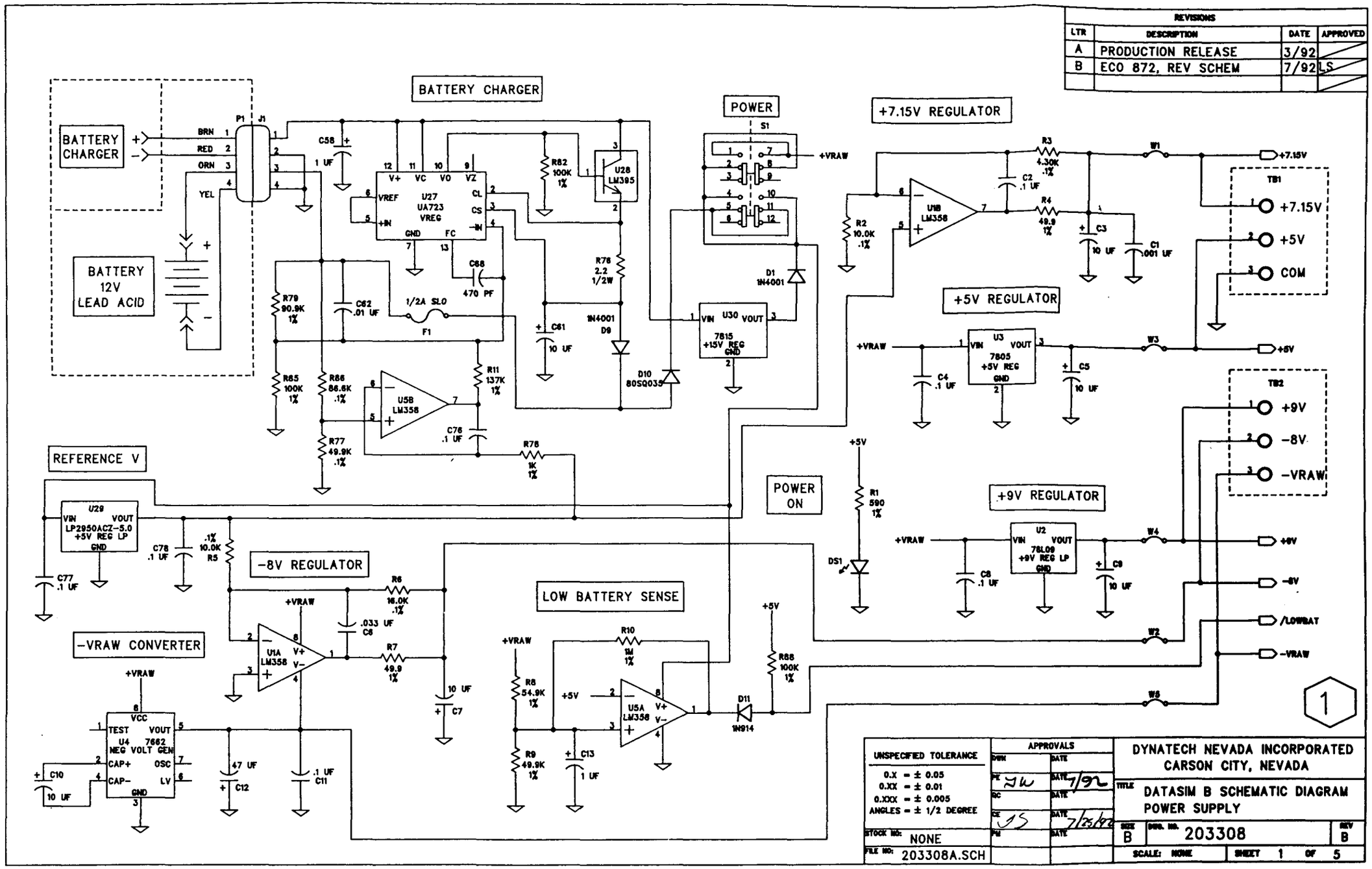
R004	0307-1014	RES MF 1/8W 1% 10K	1
R005	0307-1014	RES MF 1/8W 1% 10K	1
R006	0307-1014	RES MF 1/8W 1% 10K	1
R007	0326-0120	RES VAR 1/2W 10% 20K	1
R008	0307-1014	RES MF 1/8W 1% 10K	1
R009	0307-1014	RES MF 1/8W 1% 10K	1
R010	0307-1014	RES MF 1/8W 1% 10K	1
R011	0307-1014	RES MF 1/8W 1% 10K	1
S001	2505-0067	PENDANT KEYBRD 16 KEYS	1
TB01	2710-0297	CONN, 1 PIN	1
U001	2122-0187	DATASIM PEND MPU PROG	1
Y002	1220-0012	CRYSTAL 4.00 MHZ	1
ZZ01	4713-0056	STND OFF SW 4-40 X .718 LNG	4
ZZ02	5201-0299	DS PANDANT PCB BASIC	1
ZZ03	3007-0027	WIRE #22 BUSS TINN 1/4 LG	2
ZZ04	5001-0372	LBL BARCODE SERIALIZED	1

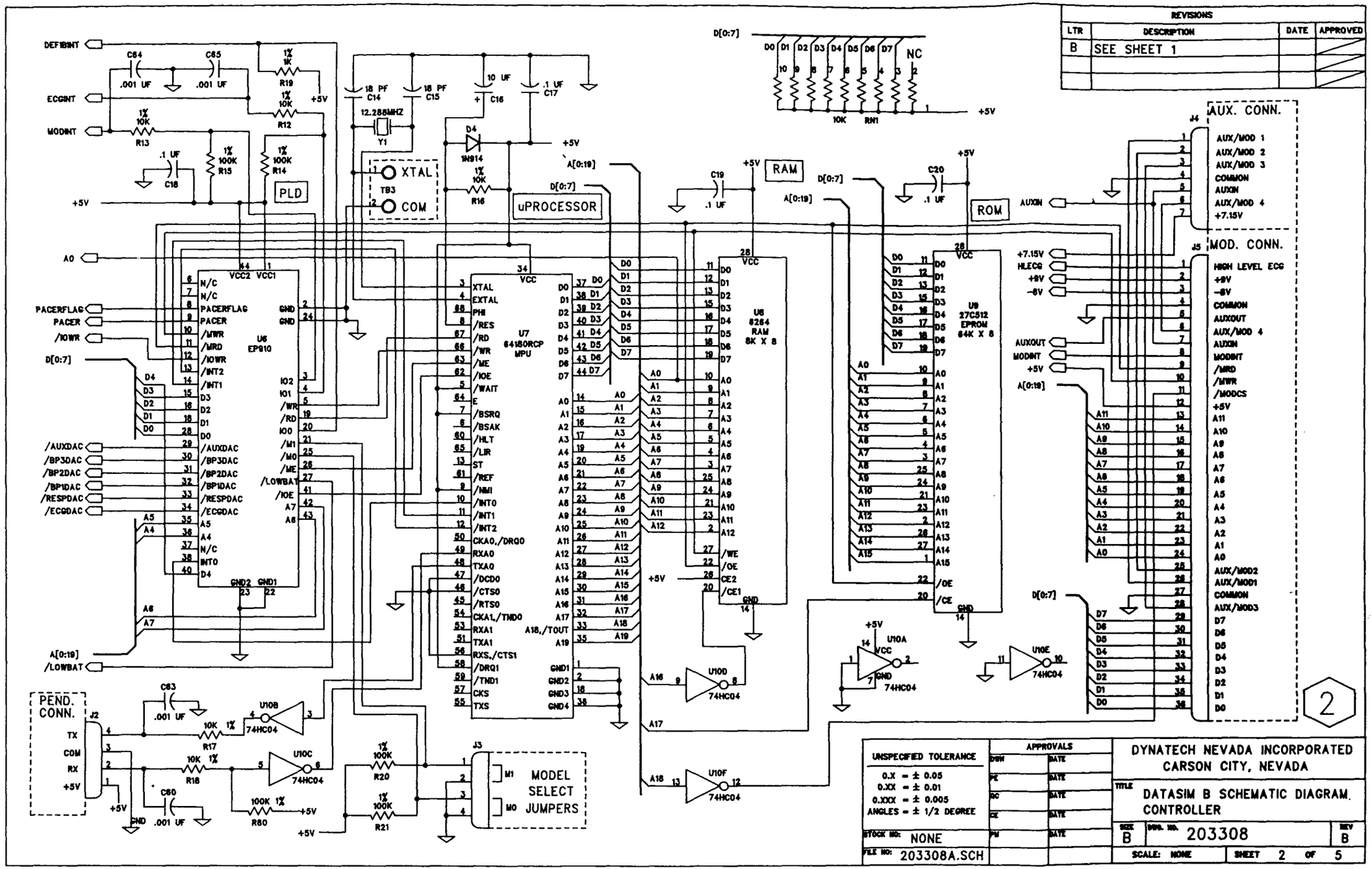
Component Locator - Main PCB

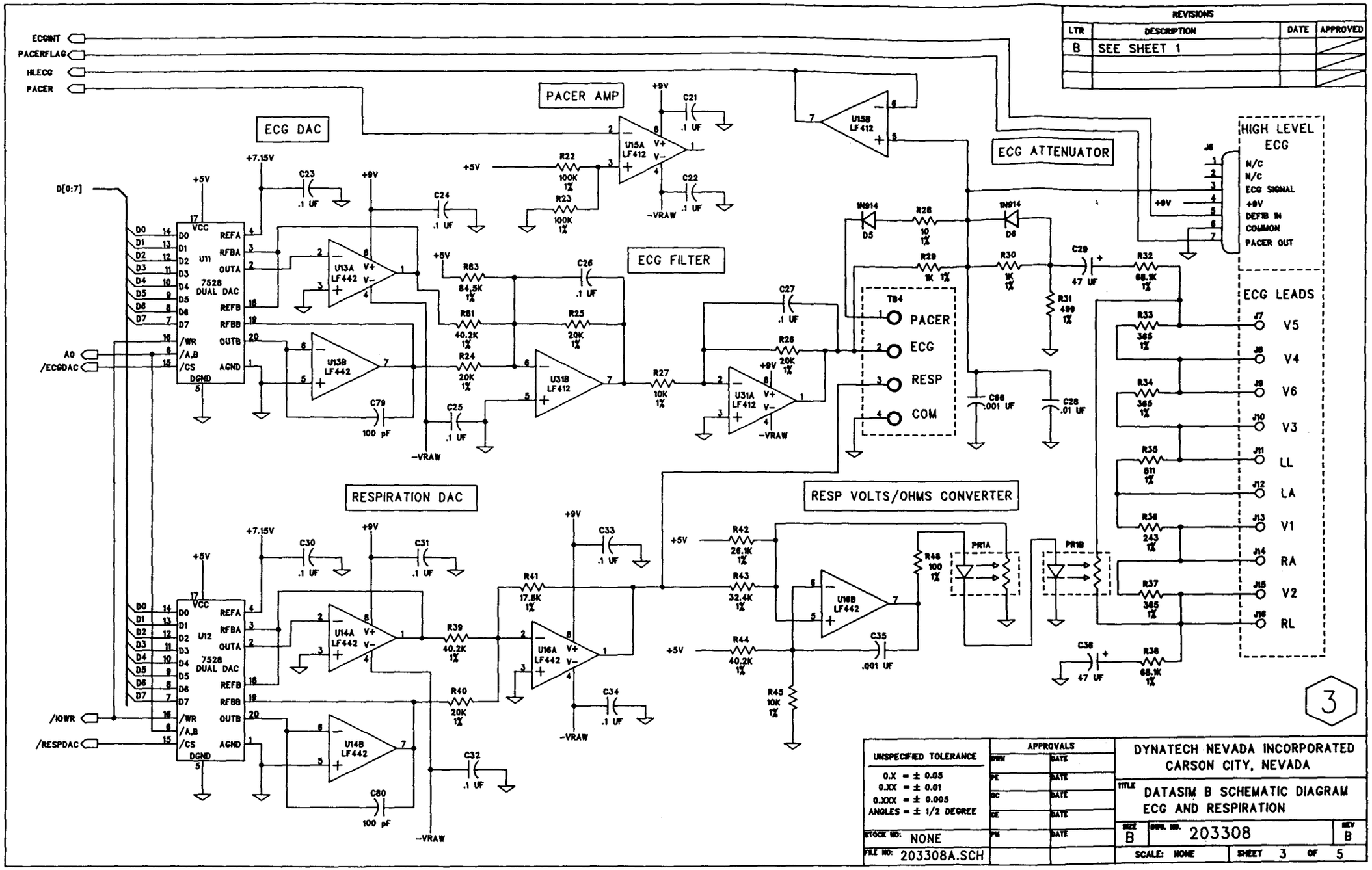


Component Locator - Pendant




REVISIONS
LTR | DESCRIPTION | DATE | APPROVED
A | PRODUCTION RELEASE | 3/92
B | ECO 872, REV SCHEM | 7/92 LS
BATTERY CHARGER
BATTERY CHARGER
BATTERY 12V LEAD ACID
P1 J1
BRN 1
RED 2
ORN 3
YEL 4
C58 1 UF
U27 UA723 VREG
V+ VC VO VZ
VREF +IN GND FC CL CS -IN
R82 100K 1%
U28 LM395
R76 2.2 1/2W
C68 470 PF
R79 90.9K 1%
C62 .01 UF
1/2A SLO F1
C61 10 UF
1N4001 D9
D10 80SQ035
R65 100K 1%
R66 86.6K .1%
R77 49.9K .1%
U5B LM358
R11 137K 1%
C76 .1 UF
R78 1K 1%
POWER
S1
+VRAW
D1 1N4001
U30 7815 +15V REG
VIN VOUT GND
+7.15V REGULATOR
R3 4.30K .1%
W1
+7.15V
C2 .1 UF
U1B LM358
R4 49.9 1%
C3 10 UF
C1 .001 UF
R2 10.0K .1%
TB1
+7.15V
+5V
COM
+5V REGULATOR
+VRAW
U3 7805 +5V REG
VIN VOUT GND
C4 .1 UF
C5 10 UF
W3
+5V
TB2
+9V
-8V
-VRAW
REFERENCE V
U29 LP2950ACZ-5.0 +5V REG LP
VIN VOUT GND
C77 .1 UF
C78 .1 UF
.1% 10.0K R5
POWER ON
+5V
R1 590 1%
DS1
+9V REGULATOR
+VRAW
U2 78L09 +9V REG LP
VIN VOUT GND
C8 .1 UF
C9 10 UF
W4
+9V
-8V REGULATOR
R6 16.0K .1%
.033 UF C6
U1A LM358
R7 49.9 1%
10 UF C7
-VRAW CONVERTER
U4 7662 NEG VOLT GEN
VCC TEST VOUT CAP+ OSC CAP- LV GND
C10 10 UF
47 UF C12
.1 UF C11
LOW BATTERY SENSE
R10 1M 1%
R8 54.9K 1%
R9 49.9K 1%
U5A LM358
C13 1 UF
D11 1N914
R88 100K 1%
W2
/LOWBAT
-VRAW
W5
1
UNSPECIFIED TOLERANCE
0.X = ± 0.05
0.XX = ± 0.01
0.XXX = ± 0.005
ANGLES = ± 1/2 DEGREE
STOCK NO: NONE
FILE NO: 203308A.SCH
APPROVALS
DWN DATE
PE DATE 7/92
QC DATE
CE DATE 7/15/92
PM DATE
DYNATECH NEVADA INCORPORATED
CARSON CITY, NEVADA
TITLE DATASIM B SCHEMATIC DIAGRAM
POWER SUPPLY
SIZE B
DWG. NO. 203308
REV B
SCALE: NONE
SHEET 1 OF 5


REVISIONS
LTR | DESCRIPTION | DATE | APPROVED
B | SEE SHEET 1
PLD
uPROCESSOR
RAM
ROM
XTAL
COM
AUX. CONN.
MOD. CONN.
MODEL SELECT JUMPERS
PEND. CONN.
U6 EP910
U7 64180RCP MPU
U8 6264 RAM 8K X 8
U9 27C512 EPROM 64K X 8
74HC04
12.288MHZ
1N914
UNSPECIFIED TOLERANCE
0.X = ± 0.05
0.XX = ± 0.01
0.XXX = ± 0.005
ANGLES = ± 1/2 DEGREE
APPROVALS
DRAWN
PE
QC
CE
PM
DATE
STOCK NO: NONE
FILE NO: 203308A.SCH
DYNATECH NEVADA INCORPORATED
CARSON CITY, NEVADA
TITLE
DATASIM B SCHEMATIC DIAGRAM. CONTROLLER
SIZE B
DWG. NO. 203308
REV B
SCALE: NONE
SHEET 2 OF 5
2



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	SEE SHEET 1		

UNSPECIFIED TOLERANCE	APPROVALS	
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0.XX = ± 0.01	PE	DATE
0.XXX = ± 0.005	QC	DATE
ANGLES = ± 1/2 DEGREE	CE	DATE
STOCK NO: NONE	PM	DATE
FILE NO: 203308A.SCH		

DYNATECH NEVADA INCORPORATED
CARSON CITY, NEVADA

TITLE: DATASIM B SCHEMATIC DIAGRAM
ECG AND RESPIRATION

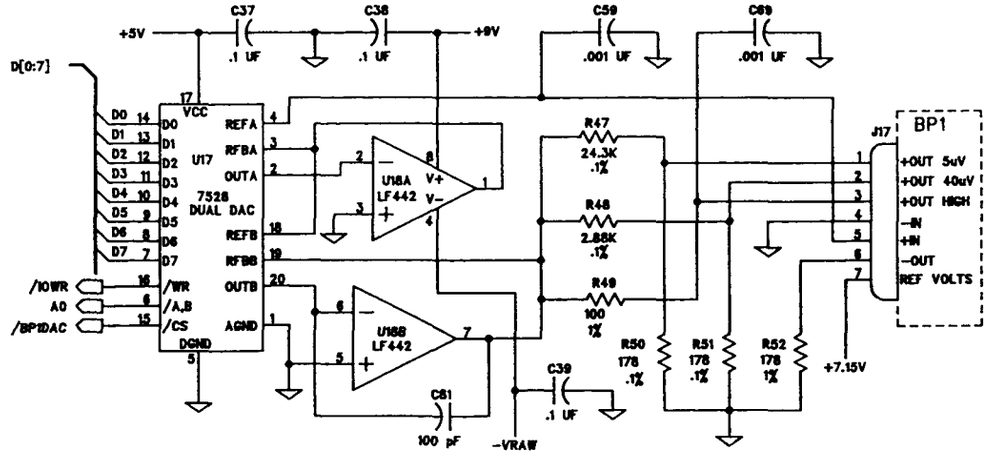
SIZE	DWG. NO.	REV
B	203308	B

SCALE: NONE | SHEET 3 OF 5

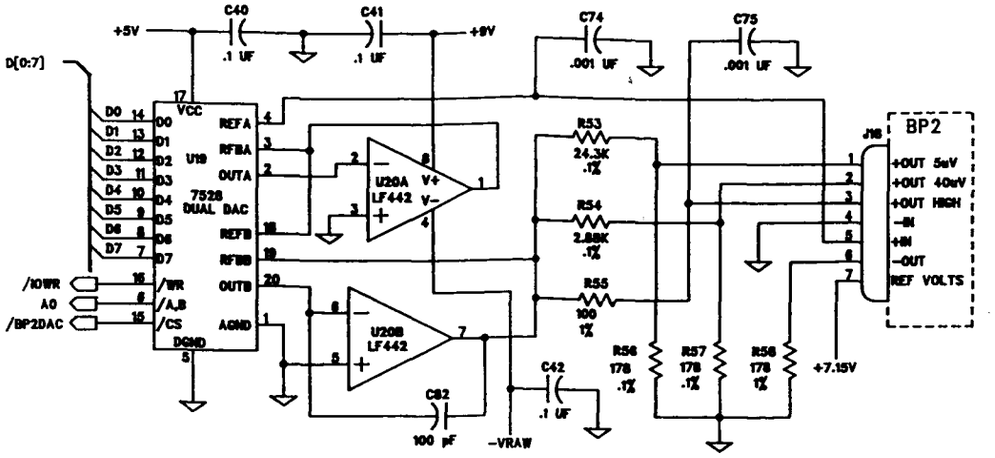
3

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	SEE SHEET 1		

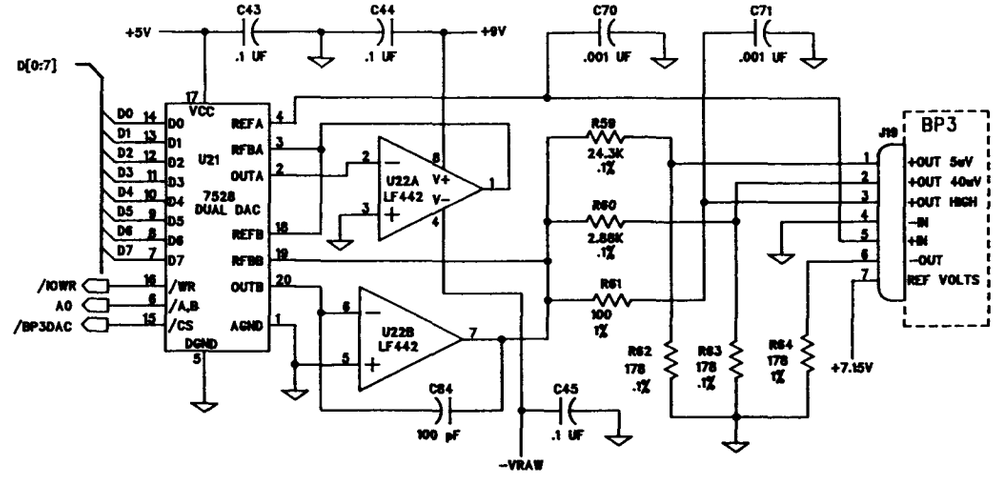
BLOOD PRESSURE CHANNEL 1



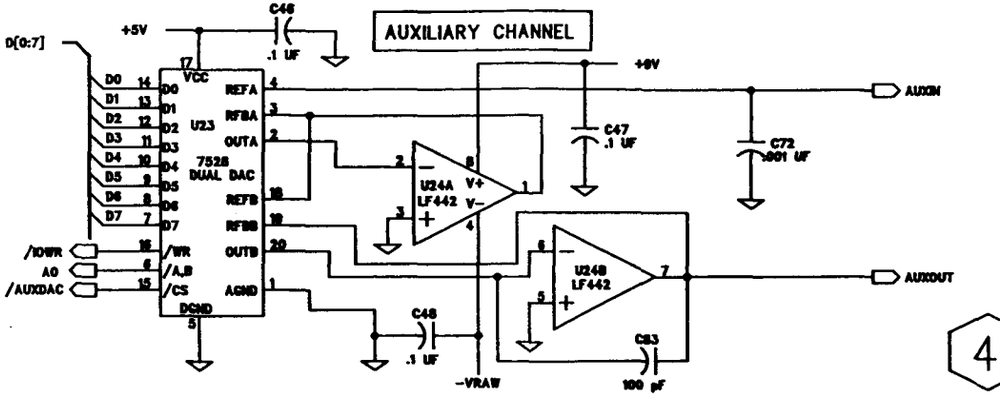
BLOOD PRESSURE CHANNEL 2



BLOOD PRESSURE CHANNEL 3



AUXILIARY CHANNEL



4

UNSPECIFIED TOLERANCE	APPROVALS		DYNATECH NEVADA INCORPORATED CARSON CITY, NEVADA
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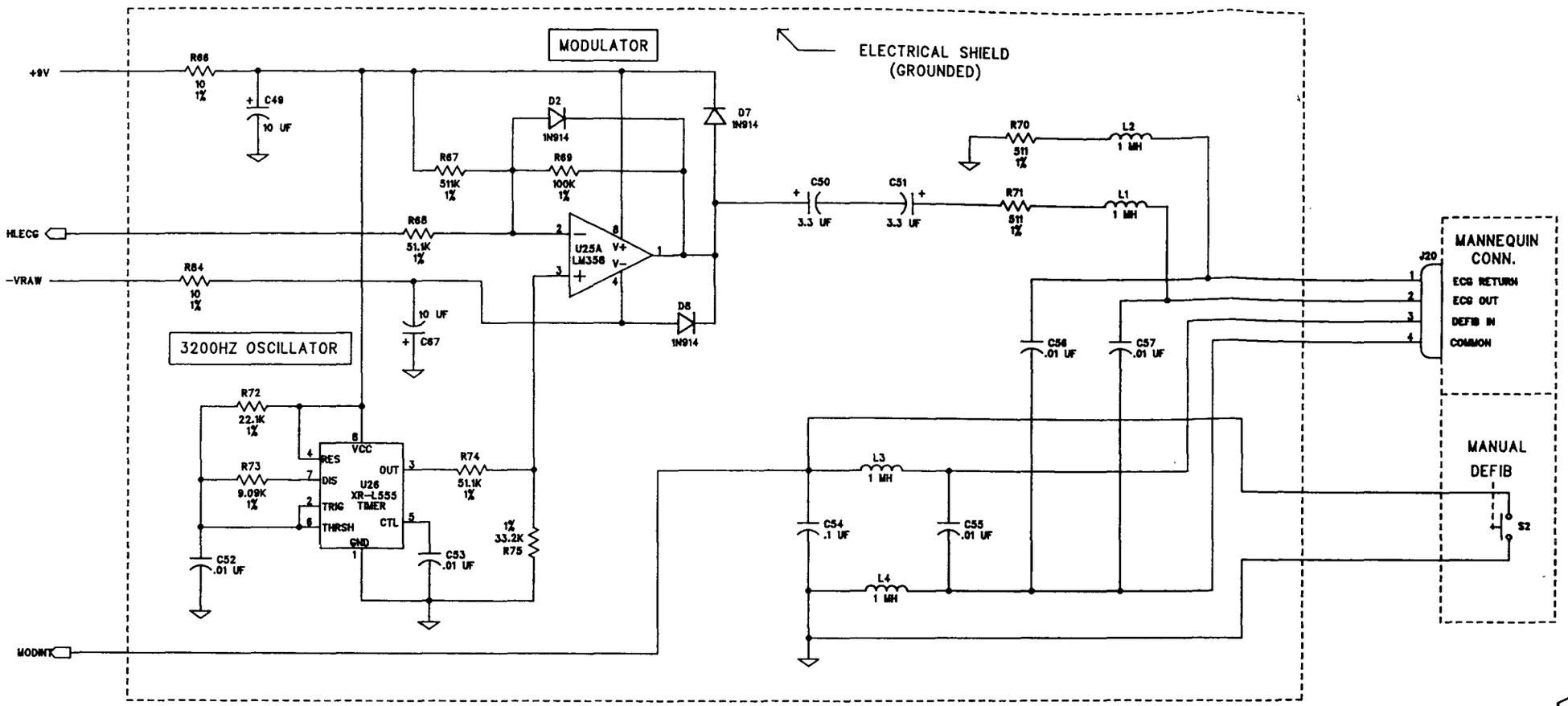
0.XXX = ± 0.005	QC	DATE	
ANGLES = ± 1/2 DEGREE	CE	DATE	SIZE: B — DWG. NO.: 203308 — REV: B
STOCK No: NONE	PM	DATE	SCALE: NONE — SHEET 4 OF 5
FILE No: 203308A.SCH			

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	SEE SHEET 1		



5

UNSPECIFIED TOLERANCE	APPROVALS		DYNATECH NEVADA INCORPORATED CARSON CITY, NEVADA	
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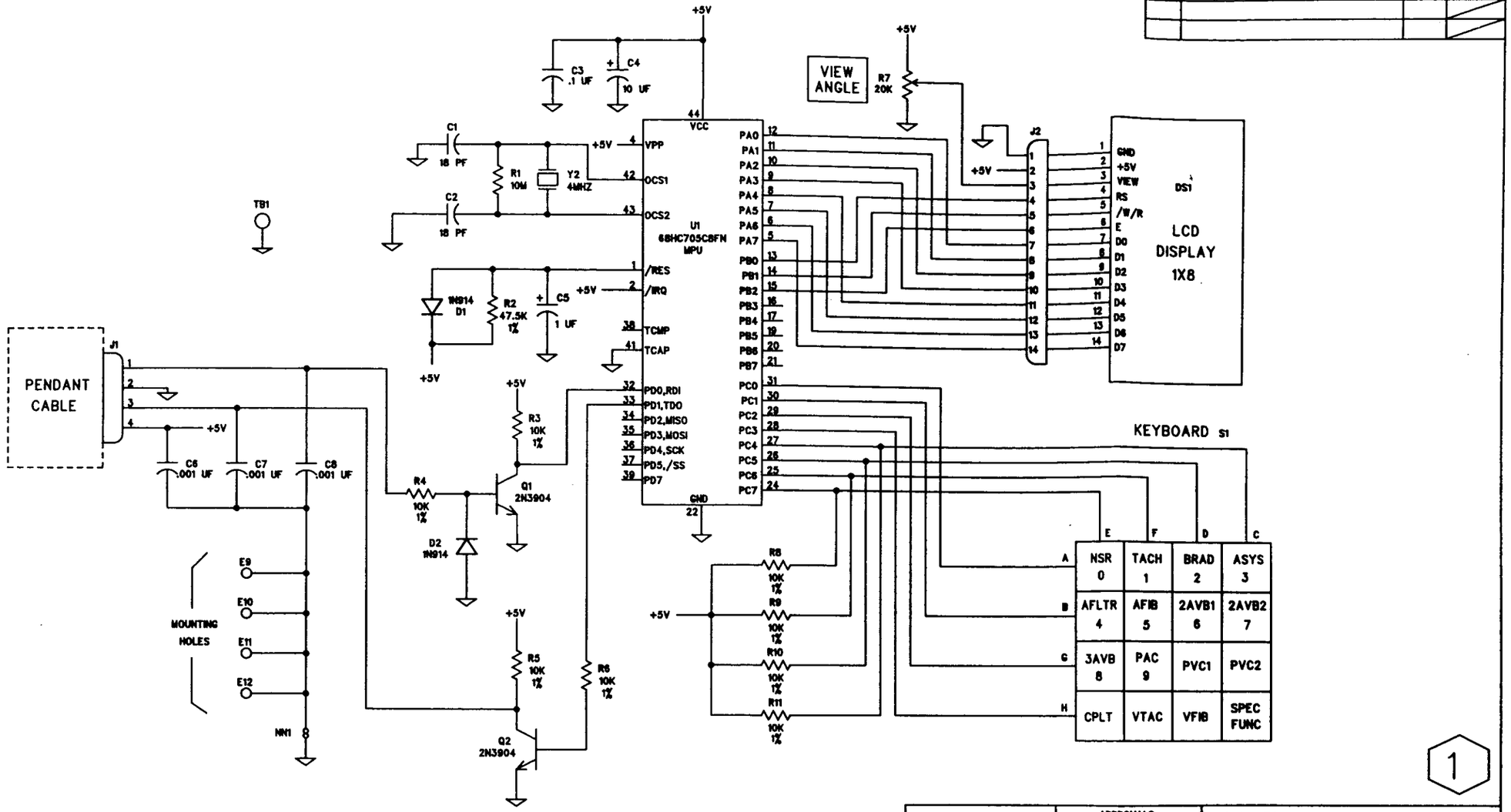
STOCK NO: NONE	PE	DATE	SIZE: B	DWG. NO: 203308
FILE NO: 203308A.SCH	QC	DATE	SCALE: NONE	SHEET 5 OF 5
	QE	DATE		REV: B
	PM	DATE		


REVISIONS
LTR | DESCRIPTION | DATE | APPROVED
A | PRODUCTION RELEASE | 3/92
PENDANT CABLE
J1
TB1
MOUNTING HOLES
E9
E10
E11
E12
NN1
C1 18 PF
C2 18 PF
C3 .1 UF
C4 10 UF
C5 1 UF
C6 .001 UF
C7 .001 UF
C8 .001 UF
R1 10M
R2 47.5K 1%
R3 10K 1%
R4 10K 1%
R5 10K 1%
R6 10K 1%
R7 20K
R8 10K 1%
R9 10K 1%
R10 10K 1%
R11 10K 1%
Y2 4MHZ
1N914 D1
D2 1N914
Q1 2N3904
Q2 2N3904
+5V
VIEW ANGLE
U1 68HC705C8FN MPU
VCC
VPP
OCS1
OCS2
/RES
/IRQ
TCMP
TCAP
PD0,RDI
PD1,TDO
PD2,MISO
PD3,MOSI
PD4,SCK
PD5,/SS
PD7
GND
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
J2
DS1
LCD DISPLAY 1X8
GND
+5V
VIEW
RS
/W/R
E
D0
D1
D2
D3
D4
D5
D6
D7
KEYBOARD S1
E
F
D
C
A
B
G
H
NSR 0
TACH 1
BRAD 2
ASYS 3
AFLTR 4
AFIB 5
2AVB1 6
2AVB2 7
3AVB 8
PAC 9
PVC1
PVC2
CPLT
VTAC
VFIB
SPEC FUNC
1
UNSPECIFIED TOLERANCE
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0.XX = ± 0.01
0.XXX = ± 0.005
ANGLES = ± 1/2 DEGREE
STOCK NO: NONE
FILE NO: 203382A.SCH
APPROVALS
DWN TW DATE 3/92
PE TW DATE 3/92
QC DATE
CE DATE 3/92
PM DATE
DYNATECH NEVADA INCORPORATED
CARSON CITY, NEVADA
TITLE DATASIM B SCHEMATIC DIAGRAM PENDANT
SIZE B
DWG. NO. 203382
REV A
SCALE: NONE
SHEET OF